The Training School **Bulletin**

"For the practicing professions concerned with mental retardation"

NOVEMBER, 1958

Diagnosing Child Behavior

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Comparison of Psychological Measures

Mortimer Garrison, Jr.

Home-School Co-operation

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1. Articles of a technical nature, e. g., reports of research, discussion of problems in the field.
2. Non-technical articles of general interest, e. g., human interest stories of the mentally retarded, restatements of technical material for the layman.
3. Book reviews and news notes.
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'The Tyranny of Teamwork'

In the October 3, 1958 issue of "Science" an editorial appeared by Richard S. Uhrbrock of Ohio University at Athens, Ohio, which concerned itself with a most provocative line of thought. We quote:

" 'Research done in industrial laboratories is now the major portion of research in progress in this country and is increasing steadily' *(American Scientist 46, 24, 1958)* . . . Many scientists who enter industrial employment constitute a lost legion so far as publication of research results is concerned . . . The research team is . . . essentially a managerial control device . . . 'We all work so closely together that you can't say one man did one thing and another something else' *(Fortune 56, 160, November, 1957)*."

"His superiors will determine the direction of the research and may subdivide the work . . . A man may . . . have no published record of his research . . . (and be) unable to present evidence of his status as a productive scientist . . . (He can) protect himself from the tyranny of 'team management' . . . (by) choos(ing) a university career . . . (or) Before accepting (industrial) employment he should obtain a statement in writing that will protect his rights as a scientist."

Could the lone investigator, not always well supported or recognized, representing the renaissance of scientific thinking characteristic of the past few centuries be a symbol of the eighteenth and nineteenth centuries? Certainly he grew up in a world of comparatively moderate population where knowledge was not widespread and where any worker tended to carry his task from its beginning through to its completion regardless of how many varied skills were involved. In this climate he who stood aside to study and investigate was different from his fellowman and, whether respected or not, when he made a discovery it could be identified with him.

Obviously as more and more knowledge was revealed, as the printing press made preservation of information more possible, the quantity of material made it difficult for a person to acquire all the knowledge in any area. Thus the specialist came into being. Of course, it was only a matter of time before specialization became too minute and some process of synthesis had to develop so that the pieces might be placed into some orderly whole. Thus the team came into prominence, possibly the twentieth century counterpart of the earlier individual pioneer.

In any team, credit must be divided. This may irk a capable worker with individual professional ambitions but he may represent a minority. When the demand for "research scientists" develops to present proportions, many enter work minus the zeal and the ability of the lone nineteenth century investigator. To these the team with its divided responsibilities may offer a satisfactory medium in which to exist. They speak not of having done the work individually but say they "were part of the ------ Project."

This brings up a background picture which must be recognized. The Industrial Revolution began to affect our nation strongly in the latter half of the nineteenth century. The invention of mass production techniques created a group of workers who no longer felt the desire to "be the boss" someday. Repetitive work in a narrow field (specialization?) could become a man's life work. He no longer knew of or cared about the total process which spawned an intricate product. He was part of a team. He needed the union and got it. In time the government began to appreciate the philosophy of the union and more and more "social legislation" came into being. Like the teaching in public school classrooms that finds itself geared to children slightly below the average of the class so that the majority of the class may advance together, so the union and the developing social welfare state in order to aid the greatest numbers found their efforts geared to those slightly less successful than the average. This was interpreted as "democratic." This philosophy of the protection of the majority with its array of what have become known as "fringe benefits" has become part of our everyday life. Elements of it permeate every organization where work is carried on, be it industrial, governmental, or even university. Although many condemn some of the benefits, these same people enjoy others gained from the same philosophy.

Unless a premium is placed conscientiously on top quality work the path must lead to ever more obliteration of the individual. Even on a top quality level, it is only he who makes effort "above and beyond" who can be identified. Personnel rating systems that judge everything but the quality of work done (because superiors might be biased) will not aid the individual. Seniority advancement which assumes in longevity confirmation of top quality work will not. Indiscriminate publication of practically everything that is written up (because some future worker may prove its true value) will not.

Perhaps we have grown beyond the individual. Whether we like it or not, our lives are made up of committees (teams of discussants), clinics (teams of practitioners), and, ever coming into the picture,

interdisciplinary research efforts (teams of investigators). They are not models of efficiency but they are symbols of our times. It may be that yearning for the development of more Newtons, Gallileos, and Pasteurs in the atmospheres in which they labored is unrealistic. In the United States the fantastic growth of population, the increasingly involved industrial organizations, the more socialistic trends of government, the growth of universal education have made a world few of us can understand. Trying to better it becomes more and more difficult.

Individuals with the genius to investigate and solve problems by themselves become proportionately less in our number. Masses of workers ground out from our brain factories become labelled as specialists but have not that genius. They find the team a plausible, if protective, answer. If this leads to the obliteration of the individual, will the majority weep? If these workers demand the esteem formerly accorded the genius and pay far in excess of his, will the implications allow us to develop our minds and our world progressively and successfully? We note the appearance of a novel like Ayn Ryan's "Atlas Shrugged," whose story is a commentary on an ultimate situation when these workers convince themselves of their ability to take over leadership from those who had the capacity to build the original organization that gave them their jobs.

Although the answer cannot be a simple one, should not our efforts lie in the improvement of team techniques so that some of the conditions which we have learned to prize in the past may be nurtured and other more beneficial results of collaboration be developed? It is doubtful if the world can ever without the leadership of individuals. Without this conviction many of us would face a despondent future indeed. But the individual of today and tomorrow must learn to control more than the elements of the problem he intends to investigate. He must be able to understand the techniques of team operation, the tolerance and coordination which are the essence of such work, and yet have the opportunity for personal approval (as through publication) as may lead him on to greater endeavor.

Dr. Uhrbrock's concern is reasonable although his suggestion of retreat to the universities may not suffice. His hopes that credit systems may be written into contracts with industrial (and governmental?) organizations may be difficult to realize with younger employees. Like him, we are greatly concerned with the identity and the development of the individual. Unless we look forward to life as described in George Orwell's "1980," we must have faith in the individual. We must imbue him at all times with the spirit of a Phoenix. To do this we must allow him room to roam in his work. We must hold before him the star of unattainable perfection to which he can hitch his wagon.

This means that we cultivate our best, make possible a productive atmosphere for them, and esteem their presence. To many this has the familiar sound of the past and the past always has had time to exhibit its weaknesses. They tend to dream of new and different worlds which, as they develop under the protection of a tried and existing order, seem successful too easily. By themselves they too would exhibit their faults. But our standard of giving all we can to as many as we can conflicts with cultivating our best. In a nation such as ours what most people want will probably come into being. Most people are not concerned with whether an individual research scientist publishes his results as an individual.

In the meantime we should remember that when money is forthcoming in any impressive quantity there comes a time when the supplier, be he in industry or in government (which includes the taxpayer himself) will tend to want to know what is happening with that money. Some will extend this interest to plans for research in which they themselves are interested. Others will establish various kinds of inspectorial activities. It would seem that as greater amounts of money were poured into research we can expect more of these actions. Certainly the traditional individual investigator will be perturbed by them. Yet, in another editorial, *(Science, 7 September 1956)*, after reporting on the enthusiasm and effort of Russian scientists the question was raised as to whether all the academic freedom expected by American scientists was actually necessary.

Whatever the immediate answers, if we are to live with the team and utilize it fully, we must educate ourselves to master it. It may take a generation more to learn these lessons, for the team idea is yet young, especially in research. Assuming that the intelligence of our nation will not decline radically in the future, we can expect that the necessary steps will be taken to accomplish this. In the meantime it is our duty to protect the individual, if only to create an atmosphere in which a few may lead us and our teams to the levels we seek to attain.

W. J.

Diagnosing Child Behavior: II. The Behavior of Retarded and Non-Retarded Subjects in a Psychological Work-for-Reward Situation*

DONALD H. BULLOCK and DAVID B. MALINE

In a prior paper, Bullock and Wohl (1) described an experimental approach to the problem of diagnosing behavior in children. They suggested that reward learning, operant conditioning, or psychological work-for-reward methods might have two important advantages as adjuncts to existing diagnostic techniques: (a) by rewarding the subject's test behavior, such methods provide "built-in" incentives and allow for relatively direct assessment of the subject's level of motivation; (b) by making use of simple motor responses and minimal verbal instructions, such methods might overcome the language handicaps which so often make questionable the use of verbal test instructions and verbal test material originally standardized and validated with normal subjects not having language difficulties.

In an unpublished study, Maline compared kindergarten, second, fifth, and tenth grade children under conditions in which the subject could obtain a reward he'd previously chosen (e.g., candy, pennies) by pulling a knob. Maline found that tenth grade subjects, in contrast with kindergarteners, were more likely to choose pennies than candy, were more likely to remain in the situation for the full 55-minute test and to make more responses, responded at higher rates showed less intra-individual variability in their rates, and exhibited more inter-individual variability in their rates. His data suggested that behavior in the experimental situation was considerably influenced by mental age, and that the nature of the differences between the kindergarten and tenth grade subjects reflected differences in "emotional maturity."

The present paper describes results obtained when the same situation and procedure was applied to a group of retarded subjects at The Training School, Vineland, New Jersey. The aims of the project were to (a) determine similarities and differences between non-retarded and retarded subjects of comparable mental ages; (b) obtain "leads" or "hypotheses" upon which to base future research concerning the role of "emotional maturity" in mental retardation; and (c) provide a basis for evaluating the general technique as a potential diagnostic tool.

* This research was supported by funds of Dartmouth College (which provided research funds for Maline's study of non-retarded subjects during his tenure as a Dartmouth Senior Fellow, 1956-1957); by a grant from Smith, Kline & French Foundation (which provided funds for a Summer Research Fellowship for Maline in 1957, as well as funds for equipment); and by funds of the Institute of the Pennsylvania Hospital (including funds from the Theano Foundation, Mrs. E. Paul DuPont). Dr. Walter Jacob, Director, Dr. Johs. Clausen, Chief of Psychological Research, and Norma S. Wohl, M.D., Staff Psychiatrist, of The Training School at Vineland provided invaluable assistance. Dr. Bullock is Research Psychologist, Psychological Service (James J. Dixon, Ph.D., Chief), Institute of the Pennsylvania Hospital. Mr. Maline is currently a Teaching Fellow in Zoology at Dartmouth.

Method

Subjects. Two groups of subjects were tested, the original Hanover (non-retarded) group and the Vineland (retarded) group. The Hanover group consisted of forty students from the Hanover, New Hampshire public school. There were five boys and five girls from each of these grades: kindergarten, second, fifth, and tenth. The subjects were seletced randomly from volunteers, with the restriction that the sexes be equally represented at each grade level. The Vineland group consisted of fifty-eight male and female subjects tested at The Training School at Vineland, New Jersey. They were selected to represent mental age levels reasonably comparable to those of the Hanover group, and were drawn from diverse diagnostic categories.

Apparatus. Two similar but separate sets of equipment were used. A small metal knob (Lindsley manipulandum) was mounted on the front of a large wooden box. Above this was a pilot light which remained lighted throughout the test. To the left was an aperture containing a reward tray into which the reward items were delivered by a Gerbrands Universal Magazine mounted inside the box. A pilot light over this aperture lighted momentarily each time a reward was delivered. The knob, lights, and dispenser were connected by cables to an automatic programming-recording system.

Procedure. The Hanover subjects were tested in an apartment located near the school. The Vineland subjects were tested in a room located in the Psychology Laboratory of The Training School. Prior to the actual test date, each subject was asked, "If you could go into any store you wanted to and spend fifty cents, what would you buy?" This question was administered via a printed form when possible, and given orally to subjects not capable of filling out the form. With but few exceptions, all the subjects in both groups

chose either candy or to keep the pennies. The reward selected by the subject was loaded into the dispenser prior to his arrival. When the subject arrived, he was taken into the experimental room and seated before the apparatus. The experimenter (Maline) explained that the machine was working as long as the light over the knob was lighted. He then pulled the knob, thereby producing a reward item in the reward tray. This was given to the subject, and the experimenter said, "Would you like to take some ..... home with you? You know how to get them, don't you?" Any questions were answered by repeating the demonstration. When the subject began to pull the knob, the experimenter left the room, except with very young subjects, when he remained out of sight behind the subject.

The 55-minute test consisted of (a) conditioning (the reward period) — the first few responses (usually five) each produced one reward, after which there was a 25-minute period during which only one reward could be obtained per 30-second fixed interval (i.e., the first response made 30 or more seconds after the previous reward produced the next reward); (b) extinction (the no reward period) — a 25-minute period during which rewards could not be obtained; and (c) re-conditioning — a 5-minute period during which one reward could be obtained per 30-second fixed interval, as in the previous conditioning period.

Results

Comparisons between the non-retarded and retarded subjects were based upon subjects having comparable mental ages. Since the actual mental mental age data for the Hanover subjects was not available, it was necessary to make certain assumptions about the mental age levels associated with kindergarten, second, fifth, and tenth grade non-retarded subjects. It was assumed that the Hanover subjects represented an I.Q. range of 90-120. Using the minimum chronological age as the base (i.e., kindergarteners — 5 yrs., second graders — 7 yrs., etc.), the following mental age ranges were assigned to each grade level:[1]

Pre-Kindergarten:	4 yrs., 5 mos. or less
Kindergarten:	4 yrs., 6 mos. to 6 yrs., 0 mos.
Second Grade:	6 yrs., 4 mos. to 8 yrs., 5 mos.
Fifth Grade:	9 yrs., 0 mos. to 12 yrs., 0 mos.
Tenth Grade:	13 yrs., 6 mos. or more

Table 1.

The sex, chronological age, and mental age data for the non-retarded (Hanover) group and retarded (Vineland) group.

	HANOVER GROUP		VINELAND GROUP	
	Male	Female	Male	Female
PRE-KINDERGARTEN (M.A. 4-5 or less)				
Number	0	0	9	3
Age Range	—	—	9-31	8-10
Median M.A.	—	—	4-2	3-6
KINDERGARTEN (M.A. 4-6 to 6-0)				
Number	5	5	11	5
Age Range	5-6	5-6	10-29	11-24
Median M.A.	5+	5+	5-7	5-4
SECOND GRADE (M.A. 6-4 to 8-5)				
Number	5	5	14	4
Age Range	7-8	7-8	13-37	13-19
Median M.A.	7+	7+	6-9½	7-0
FIFTH GRADE (M.A. 9-0 to 12-0)				
Number	5	5	6	6
Age Range	10-11	10-11	14-48	17-27
Median M.A.	10+	10+	9-9	10-6
TENTH GRADE (M.A. 13-6 or more)				
Number	5	5	0	0
Age Range	15-16	15-16	—	—
Median M.A.	14+	14+	—	—

Each Vineland subject was assigned a grade designation based upon the most recently reported mental age data in his clinical file. The procedure necessarily introduced limitations upon the generality of the findings, and a projected replication of the research with non-retarded subjects will not only include mental age data, but will also include sampling pre-kindergarten and first grade level subjects. Table 1 presents the number of subjects, sex, chronological age range, and median mental age for each grade level of each group.

Tables 2 and 3 present selected data for each group as a function of the grade (mental age) levels used in making comparisons between the groups. The tables include (a) reward choice; (b) time spent in the situation and the proportion of subjects who left during conditioning, left during extinction, or remained for the full test; (c) total number of responses; (d) responses per minute for the overall test and the conditioning and extinction sub-periods; (e) the intra-individual variability index for the conditioning period rate; (f) the average deviation from the median reponse rate of the conditioning period (the inter-individual or group variability); and (g) the per cent change in rate during the extinction period (for those subjects who completed the test).

Table 2.
Selected data for each grade of the non-retarded group.

	Kindergarten	Second Grade	Fifth Grade	Tenth Grade
1. Reward Choice†				
Pennies	2/10	0/10	9/10	10/10
Candy	8/10	8/10	0/10	0/10
2. Time Spent in the Situation				
Median Minutes	36	55	55	55
Range	7-55	55-55	55-55	55-55
Left in Conditioning	3/10	0/10	0/10	0/10
Left in Extinction	3/10	0/10	0/10	0/10
3. Total Number of Responses				
Median Number	1312.5	1550.0	1752.5	5788.0
Range	35-3726	95-7511	130-7120	2316-9879
4. Responses per Minute				
Median, Overall Test‡	42.8	28.2	31.9	105.0
Range, Overall Test	3.5-67.7	1.7-136	2.4-129	42-179.5
Median, Conditioning	47.5	11.0	33.0	104.0
Range, Conditioning	5.8-69.4	2.2-123	3-121	46.3-168.9
Median, Extinction	50.8	24.8	29.3	103.9
Range, Extinction	.8-75	1-145	1.4-138	40.3-180.6
5. Intra-Individual Variability Index, Conditioning§				
Median	.98	.86	.49	.425
Range	.70-1.00	.40-1.00	.14-1.00	.09-1.00
6. Average Deviation from Median Period Response Rate				
Average Deviation	19.9	28.3	27.2	37.4
7. Change in Rate during Extinction Period (Full Session Subjects Only)				
Median Per Cent Change	—.085	—.07	—.085	.00
Range	.00 to —.89	+19 to —1.00	+.05 to —.67	+.25 to —.50

† Where the values do not total ten, subjects selected plastic toys.
‡ Total number responses divided by time subject actually remained in the situation.
§ Highest rate per 30-sec. minus lowest rate per 30-sec. divided by the highest rate per 30-sec.

1. Reward choice. In both groups the subjects with higher mental ages were more likely to choose pennies. The fact that the retarded subjects were less likely to choose pennies than were the non-retarded may have been due to the fact that the former did not ordinarily use money as a medium of exchange in their daily activities.

2. Time spent in the situation. In both groups the subjects with higher mental ages were more likely to complete the test. In the non-retarded group, only kindergarteners (6/10, 60%) failed to complete the test. The retarded subjects were less likely to complete the test, and were especially likly to leave the situation during the extinction period. At the kindergarten, second, and fifth grade levels, 20/46 (43.5%) of the retarded subjects failed to complete the test, with 14/46 (30%) leaving during the extinction period. Of the non-retarded subpects at the same grade levels, 6/30 (20%) left before completing the test, with 3/30 (10%) leaving during extinction.

3. Total number of responses. In both groups the subjects with higher mental ages tended to produce more responses, as would be expected, in part, on the basis of the fact that subjects with higher mental ages were more likely to complete the test an, therefore, had more total time in which to respond. Between and within groups comparisons at the kindergarten, second, and fifth grade levels were not statistically significant.

Table 3.
Selected data for each grade (mental age) level of the retarded group.

	Pre-Kindergarten	Kindergarten	Second Grade	Fifth Grade
1. Reward Choice				
Pennies	0/12	0/16	4/18	7/12
Candy	12/12	16/16	14/18	5/12
2. Time Spent in the Situation				
Median Minutes	17.5	40.0	52.0	55.0
Range	3-55	9-55	5-55	43-55
Left in Conditioning	7/12	4/16	2/18	0/12
Left in Extinction	2/12	6/16	7/18	1/12
3. Total Number of Responses				
Median Number	324.0	515.5	1142.0	3005.0
Range	18-1753	31-4150	23-5365	217-7053
4. Responses Per Minute				
Median, Overall Test†	26.8	28.9	20.8	54.8
Range, Overall Test	6-38.8	2.2-92.2	1.6-97.5	4.2-128.2
Median, Conditioning	26.0	29.0	21.0	62.5
Range, Conditioning	6-41.4	2.2-98	1.6-104.1	6-142.5
Median, Extinction	27.5	22.6	20.0	44.8
Range, Extinction	11.2-31.3	2.7-99.7	2.6-96.4	2.4-121.8
5. Intra-Individual Variability Index, Conditioning‡				
Median	1.00	1.00	1.00	.88
Range	1.00-1.00	.95-1.00	.25-1.00	.375-1.00
6. Average Deviation from Median Conditioning Period Response Rate				
Average Deviation	8.7	25.8	25.4	31.2
7. Change in Rate during Extinction (Full Session Subjects Only)				
Median Per Cent Change	—.715	—.855	—.66	—.40
Range	+.33 to —1.00	—.14 to —1.00	.00 to —1.00	+.43 to —.75

† Based upon total number of responses divided by the actual time the subject remained in the situation.
‡ The highest rate per 30-sec. minus the lowest rate per 30-sec. divided by the highest rate per 30-sec.

4. Responses per minute. In both groups the subjects with the highest mental ages (i.e., tenth grade non-retarded, fifth grade retarded) tended to respond at higher rates during the overall test and the conditioning and extinction periods. Between and within group comparisons at the kindergarten, second, and fifth grade levels were not statistically significant. Tenth grade non-retarded subjects did respond at significantly higher rates than all other sub-groups, but inspection of Tables 2 and 3 indicates that there was no systematic relation between rate of response and mental age level in either group.

5. Intra-individual variability. In order to assess the degree of variability occurring in each individual's rates during the conditioning period, a rough measure was developed which involved subtracting the lowest rate from the highest rate and dividing the result by the highest rate. The actual values used were obtained by taking 30-second samples of the cumulative response curves. The highest variability index possible was 1.00, which meant that the subject produced at least one 30-second period of no response. The lowest variability index possible was 0.00, which meant that the subject responded at the same rate throughout. In the non-retarded group a systematic relation occurred between grade level and variability, with kindergarteners yielding significantly greater variability indexes than tenth graders.

In the retarded group, 47/58 (81%) of the subjects yielded values of 1.00. There was a slight but statistically insignificant trend for fifth grade level retarded subjects to be less variable than those at the lower grades. Between group comparisons at the kindergarten, second, and fifth grade levels indicated that the non-retarded subjects were significantly less variable in their conditioning period response rates than were the retarded.

6. Average deviation. The average deviation from the median conditioning period response rate was used to evaluate the extent to which individuals within each sub-group were alike. In both the non-retarded and retarded groups, the subjects with the lowest mental ages produced the lowest average deviations (were more alike) and those with the highest mental ages produced the highest average deviations (were least alike). Inspection of Tables 2 and 3 does not indicate that between group differences occurred at the kindergarten, second, and fifth grade levels.

7. Change in response rates during extinction. For those subjects who completed the test in both the non-retarded and retarded groups, the response rate during the first five and last five minutes of the extinction period was measured from the cumulative records and used to determine the per cent change occurring in the extinction period rate for each individual. For the non-retarded subjects there was a slight but statistically insignificant trend for subjects with higher mental ages to show less of a decline in rate.

In the retarded group, those subjects who completed the test were significantly more likely to show a decline of 40% or more in extinction response rate than were the non-retarded subjects of comparable mental ages. In the retarded group the degree of decline in rate appeared to be systematically related to mental age: as mental age increased, the amount of decline decreased.

The meaning of this difference between non-retarded and retarded subjects with respect to decline in extinction response rates was not clear. Certainly we would expect all of the subjects to show a decline if given a long enough period of no reward. The data presented here merely indicate that during a 25-minute no reward period (following 25-minutes of 30-second fixed interval reward) the retarded subjects were more likely to show a decline. Since each subject was informed by the experimenter that the machine was working as long as the light over the knob was lighted, it might be that (a) retarded subjects were less able to comprehend or remember these instructions, or (b) retarded subjects were less likely to assume that this meant that they should continue responding as long as the light was on. If subsequent control studies should rule out these factors (i.e., if subjects not told about the light were to yield the same findings), then it would seem reasonable to interpret these data as showing that retarded subjects were less resistant to the effects of a period of no reward. Such a conclusion would have important practical applications with respect to training of retarded subjects in situations involving "frustration."

Summarizing the data in Tables 2 and 3

1. In both the non-retarded and retarded groups, subjects with higher mental ages were more ligely to choose pennies, more likely to complete the test and to produce more responses, more likely to respond at higher rates, less likely to exhibit a high degree of intra-individual variability in their conditioning period response rates, less

likely to yield conditioning period response rates similar to others at the same level, and less likely to show a decline in their extinction period response rates.

2. Comparing the non-retarded and retarded subjects at the kindergarten, second, and fifth grade levels, the retarded subjects were less likely to complete the test, were more likely to leave during the extinction period, were more likely to exhibit high degrees of intra-individual variability in their conditioning period response rates, and were more likely to show a decline in their extinction period response rates. The non-retarded and retarded subjects were not significantly different in their overall response rates, nor in their rates during the conditioning and extinction periods.

Discussion

How are we to interpret this finding that retarded subjects — when compared with non-retarded subjects of comparable mental ages — were less likely to complete the test, were more likely to leave the situation when responses were no longer rewarded, produced higher intra-individual variability of conditioning period response rates, and showed a greater degree of decline in response rate during extinction? Were these differences due to intelligence, motivation, or emotional maturity?

The nature of the sample of retarded subjects precluded a definitive answer to the question of the relation between experimental performance features and intelligence. Since 45/58 (77.5%) of the retarded subjects were 14 years or older, M.A. and I.Q. were highly correlated. A definitive answer would require a sample involving a reasonable degree of independence of M.A. and I.Q. An estimate of the role of intelligence was provided by comparing the retarded subjects who left during conditioning, left during extinction, or completed the full test. Table 4 presents the number of cases in each category, the median C.A.s, M.A.s, and I.Q.s, and the ranges.

Table 4.

The medians and ranges of chronological ages, mental ages, and I.Q.s associated with retarded subjects who
(a) left during the conditioning period,
(b) left during the extinction period, and
(c) remained for the full test.

	Left During Conditioning	Left During Extinction	Remained For Full Test
Number of Cases	13	16	29
Median C.A.	16	17	18
Range	8 to 37	9 to 42	9 to 48
Median M.A.	4-5	6-7	6-11
Range	2-10 to 6-6	4-4 to 9-8	3-4 to 11-8
Median I.Q.	38	48	50
Range	26 to 57	37 to 69	24 to 83

The wide range of M.A.s and I.Q.s associated with these three categories would rule against any simple relation between intelligence and experimental performance. Assuming subjects who left during conditioning to be the least mature, those who completed the test to be most mature, there was only a 12-point difference between the median I.Q.s of these two groups.

The retarded subject with the lowest I.Q. — a 31-year-old male, I.Q. 24, M.A. 3-4 — completed the test, made 720 responses, had a variability index in conditioning of 1.00, and showed a 33% decline in extinction rate. The subject with the next to the highest I.Q. — a 21-year-old female, I.Q. 82, M.A. 11-6 — yielded a very similar performance: completed the test, made 882 responses, had a conditioning variability index of .75, and showed a 50% decline in extinction rate.

Motivational differences between the non-retarded and retarded subjects do not appear to account for the differences. If we assume that the response rate during conditioning was an index of motivational level, comparisons between the groups did not yield significant differences. Qualitatively speaking, the experimenter (Maline) did not feel that the retarded subjects were any less interested in their rewards than had been the non-retarded.

The interpretation which appeals to the authors is one which attributes the experimental performance differences between the non-retarded and retarded subjects to differences in "emotional maturity." This conception stems in part from the intuitive argument that the task of persisting in knob-pulling behavior would seem to involve minimum intelligence, but rather would test the individual's capacity to continue behaving in the face of "frustration" (e.g., intermittent reward and subsequent no reward). The formulation involves these assumptions:

1. Both non-retarded and retarded individuals acquire — as the result of their various developmental experiences — increasing degrees of emotional maturity.

2. Retarded individuals — partly because of their limited learning capacities — benefit less from their developmental experiences and perform in a less emotionally mature manner.

3. Retarded individuals vary considerably in the level of emotional maturity which they are capable of achieving, and this variation is somewhat independent of intelligence: i.e., the emotional and intelligence levels attainable by retarded individuals will not necessarily be highly correlated.

This general formulation of the results provides (a) leads for subsequent studies, and (b) a framework within which to approach the diagnostic problem of assessing the functional interaction of intellectual and emotional dimensions of retardation.

Subsequent studies. The following specific hypothesis can be offered for further investigation:

1. Below the mental age of four years, six months ("pre-kindergarten"), non-retarded subjects will out-perform retarded subjects on specific tests of learning abilities (e.g., the form-color discrimination test used by Zeaman et al [2]), but a significant proportion of the retarded subjects will out-perform the non-retarded on specific tests of emotional maturity (e.g., the specific situation and procedure used in this study).

2. In a group of retarded subjects of similar intellectual level (e.g., similar I.Q.s, similar abilities on a visual discrimination test), a wide range of experimentally defined emotional maturity levels would occur.

3. In a group of retarded subjects involving a range of M.A.s and I.Q.s which were relatively independent, experimentally defined emotional maturity levels would be found to be significantly independent of intelligence.

Experimental validation of these three hypotheses would offer strong support for our assumptions that the experimental performances of the subjects in this study reflected a "dimension" of mental retardation which should not be equated with the intelligence dimension, and would also support the formulation offered below concerning the diagnostic implications of this emotional maturity aspect.

Diagnostic implications. If we are correct in assuming that retarded individuals vary widely in their ability to acquire emotional maturity and that this aspect of their development is not entirely dependent upon their intellectual capacities, then three possible "forms" of anomalous development are possible:

1. General retardation. The individual shows comparable retardation in both intellectual and emotional development, what might be termed "retardation."

2. Intellectual retardation. The individual's emotional development exceeds his intellectual development, what might be termed "intellectual deficiency."

3. Emotional retardation. The individual's intellectual development exceeds his emotional development, what might be termed "emotional deficiency."

If subsequent research should demonstrate that individuals can be classified within this arbitrary scheme and that such classification has relevance to qualitative clinical concepts, it would seem warranted to explore fully the possibilities of developing a reward learning type diagnostic battery which would combine specific tests of learning abilities (e.g., visual form-color learning) and specific tests of emotional maturity (e.g., maintaining behavior under intermittent reward conditions). Certainly current clinical thinking relies (however implicitly) upon the premise that there are at least two important dimensions to mental retardation — the intellectual and the emotional. The exploitation of experimental techniques for elucidating intellectual and emotional aspects of both retarded and non-retarded individuals should lead to an improved understanding of the nature of retardation and better means with which to assist retarded persons.

Summary

A research project was conducted which (a) elucidated certain similarities and differences between non-retarded and retarded subjects in a specific situation involving conditioning and extinction of a simple motor response, (b) provided specific hypotheses upon which to base subsequent studies, and (c) provided preliminary data suggesting that the general method has genuine value as a potential diagnostic tool.

References

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1. It should be emphasized that in adopting this arbitrary classification procedure, we are not assuming that non-retarded and retarded subjects with similar mental ages should be treated as intellectually equivalent. In fact, the results of this study add support to previous studies (e.g., 2) which demonstrate that non-retarded and retarded individuals of the same mental age differ markedly in their psychological capabilities.

A Comparison of Psychological Measures in Mentally Retarded Boys Over a Three-Year Period As a Function of Etiology*

MORTIMER GARRISON, JR.

Introduction

This paper presents a partial analysis of data available from a three-year longitudinal study of three etiological groups of retarded boys. During the course of the study there were several personnel changes. The final form of the study was the work of Dr. George A. Satter, who also supervised the scoring and data collection. The present analysis and conclusions are the responsibility of the author.

Problem

The idea that there is a different rate of development which characterizes the retarded has been the subject of many studies. A slow rate of maturation remains one of the conditions included in the definition of mental retardation in the AAMD Statistical Manual (1). The early literature reporting changes in I.Q. in the retarded as compared with normal individuals has been summarized by Wheeler (21). A more recent study continuing this line of investigation by Thompson (20) concludes that decline in I.Q. in the adult moron begins earlier and is completed sooner than in the normal. These studies are concerned with the general problem of intellectual growth and the retarded groups studied are n o t identified by etiology.

The suggestion that there might be a different pattern of intellectual development depending upon etiology appears to have been advanced in only two papers. Strauss and Kephart (19) and Kephart and Strauss (13) offer data suggesting that upon institutionalization, the endogenous group continues to show a relatively greater gain in I.Q. than the exogenous group. In the first paper data are presented on the number of subjects whose change in I.Q. was +3 points or more, between +2 and —2, and —3 or more points. On the basis of these data presented for endogenous, mixed and exogenous etiologies, a chi-square may be computed which is statistically significant. Across the time period involved (3-4 years) a greater proportion of endogenous subjects is found in the +3 points gained group, while a greater number of the exogenous are found in the ....3 points or more category. The endogenous group increased 4 points on the average, while the mixed and exogenous groups decreased 1.56 and 2.54 points, respectively. In their second paper, the argument is presented that being institutionalized may constitute enrichment for the endogenous child (depending upon the adequacy of the institution's program) to which he responds in a greater degree than the organic limitations of the exogenous child will permit.

Aside from these two papers, most of the studies in the literature have been concerned with distinguishing between brain-injured and non-brain-injured groups. Much of this work has been summarized recently by Gallagher (10). From this point of view, several studies are relevant to the present results because of their use of the same techniques. While it has not been possible to carry out a detailed analysis of the Binet results, the findings of Hoakly and Frazeur (12) that the Binet only minimally differentiated exogenous and endogenous children is generally in keeping with the results reported here. In the same manner, Bensberg's report (4) of finding no differences between brain-injured and familial subjects in reading and arithmetic achievement is comparable to the results obtained with the California Achievement Test in this study.

Bensberg (3) also reported the use of the Bender-Gestalt drawings in matched pairs of subjects of familial and organic etiology. The mental ages ranged from 4 to 11.5 and the chronological ages from 7 to 61. While his scoring differs from that used in the present study, he concluded that the familial group were more accurate, with this differentiation taking place above a mental age of 5 years.

Feldman (9), using the Pascal-Suttell scoring of the Bender, found that the exogenous group obtained a higher mean raw score than the endogenous group, although the range and variability were comparable. He had 54 subjects in each group and controlled C.A., M.A., I.Q., and length of institutionalization.

Halpin (11) reported that reversals on the Bender were too few for quantification in contrast to Bensberg's findings.

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Baroff (2) compared his data on 84 twins with Feldman's and reported agreement in the mean Bender scores using the same scoring system. He further supported Feldman's conclusion on the correlation between the Bender score and M.A., and the frequency of design deviations associated with organicity. While only 8 of his 84 subjects had motor signs or a history strongly suggestive of organicity, they tended to be inferior to endogenous cases of comparable mental age.

Bieliauskas and Kirkham (5) reported on the use of the H-T-P technique, as scored by Jolles. They studied the responses of 24 subjects diagnosed as having some definite structural brain damage and 24 whose diagnoses included no organic or other disorders excepting "familial or without mental deficiency." These groups were matched for sex, age, months in the institution, form of Wechsler given and the Wechsler quotients. None of the 18 items scored significantly differentiated between the groups.

The Vineland Social Maturity Scale has been extensively used. The studies most comparable to the present are those of Rain (15) and Cassel and Riggs (7). With 31 males in each group matched for C.A. and M.A., Rain compared familial and non-familial etiologies. She found that the non-familial group were lower in social age and social quotient. They tended to have lower scores in the locomotion area and higher scores in the area of general self-help. Cassel and Riggs expanded the etiological classification to include an unexplained group. With 20 subjects in each of the three groups and C.A., I.Q., and length of residence matched, the organic group was again lowest in social age with the unexplained group being intermediate.

The studies cited above are tangential to the major interest in this report. They are relevant in that differences associated with etiology have been reported. In some cases, conflicting evidence exists. The problem of this study is whether any difference associated with etiology develops and maintains itself through time.

Subjects and Procedures

The selection of the subjects has previously been described by Satter (18). The mentally retarded boys were residents of The Training School. They were assigned to etiological groups according to the system of Riggs and Rain (16). The procedure involved a review of case histories and medical records supplemented by neurological examinations and electroencephalography, in addition to social work investigations of family status. A group of intellectually normal boys was selected with the cooperation of the local schools. Through time, there was considerable attrition in all groups. The matching data are shown in Table 1 for those from whom results are available through all four test sessions.

Table 1.
Matching Data for Subjects
for Whom Full Results Are Available

Group	N	C.A. Mean	C.A. SD	M.A. Mean	M.A. SD
Normal	23	7.18	1.23	7.83	1.25
Familial	21	13.31	2.41	7.20	1.53
Unexplained	20	13.22	2.24	7.32	1.29
Organic	20	12.48	2.45	7.03	1.65

All subjects were given the Stanford-Binet, Form L, the Chicago Test of Primary Mental Abilities (ages 5-7), the California Achievement Test (primary form BB), the Porteus Maze Test, the H-T-P, the Vineland Social Maturity Scale, and the Bender-Gestalt Test. The H-T-P drawings were done following directions suggested by Buck (6) and scored as described by Satter and McGee (17). The Bender drawings were scored according to Pascal and Suttel (14).

This battery was given to the subjects four times. The first two test sessions were six months apart followed at one-year intervals by the third and fourth sessions.

The actual administration of the battery and the scoring of the tests were done by competent research assistants under the supervision of Dr. Satter. While some variability may have been introduced into the results through changes in personnel, it is unlikely that this has exerted a bias in favor of any group.

Results

A sizeable number of scores were available. Not all of these were used, depending upon the limited variability between test sessions and the narrow range of scores at a given session. Many of the total possible H-T-P scores were discarded because of their uniformity. Even with this initial reduction, means and standard deviations were computed for 45 scores. These means were then plotted so that the results could be evaluated visually prior to the use of any more complex statistical procedures. Any divergent trends between the groups could be seen, the interaction between eti-

ology and test sessions being the critical issue. In those instances where it appeared that there might be some statistical significance in the trends of the group means analysis of variance was used. This was done with the Bender design VI, Arithmetic Fundamentals from the California Achievement Test and seven of the H-T-P scores. Three of the H-T-P scores were based on the time necessary to complete the drawing, three on page area; one was the Goodenough elements from the drawing of the person. Two significant interactions between groups and session were found: arithmetic fundamentals and page area in the drawing of the house. Summaries of these analyses are shown in Table 2.

Table 2.
Analysis of Variance Summary:
A. Arithmetic Fundamentals, California Achievement Test;
B. Page Area, House, H-T-P

Source	df	ms	F
A.			
Total	319	121.83	
1. columns	3	927.33	66.62
2. groups	3	313.55	0.79
3. subjects	76	396.29	
interaction 1 x 2	9	205.45	14.76
residual	228	13.92	
B.			
Total	318	1964.18	
1. columns	3	2032.92	1.82
2. groups	3	11708.92	2.90
3. subjects	76	4035.89	
interaction 1 x 2	9	2631.54	2.36
residual	227	1114.41	

To find only two significant interactions out of the total possible is something less than satisfactory. A closer look does not increase the feeling of confidence in these. The change in the normal group alone appeared to account for the significance in the arithmetic fundamentals sub-score. While there was some increase in the mean scores of the three retarded groups, these means were not significantly different at any point. The page area score from the H-T-P appeared to depend on the trend in the means of the normal and unexplained groups, which is opposite to that of the familial and organic groups. This is not the case in the other page area scores, nor do the unexplained and normal groups appear significantly associated on inspection of the other variables.

In order to get a clearer picture of what occurred across the four test sessions, t tests were used to evaluate differences between the group means at the first and the group means at the fourth sessions. The formula used was for uncorrelated measures which would tend to decrease the number of times the null hypothesis would be rejected. In view of the nature of many of the measures, this seemed appropriate.

The results of these comparisons may best be indicated by the number of times any one of the retarded subgroups may be statistically differentiated from any other. Across the 45 variables considered, the retarded subgroups may be treated statistically as one group in 39 instances in the first test session and in 42 instances in the fourth session. The normal group differed from one or more of the retarded groups in 19 instances in the first sessions and in 21 instances in the fourth session's scores. The normal group in the first session was significantly different from all three retarded groups in four instances. They were significantly higher in 3 PMA scores and lower in the VSMS occupation score. On the fourth administration, the normal group differed from the retarded groups in 18 instances. This increase occurred in the intellectual and achievement measures. In short, by the time of the final test session, the three retarded groups remained similar, and the normal group had significantly drawn away from them in intelligence and achievement measures.

Discussion

These data do not indicate any developmental pattern which would tend to differentiate the etiological groups of the retarded. If anything, the three groups appeared to resemble each other somewhat more at the end of the project than at the beginning. While one might speculate on the possible effects of the program of the institution in reducing the differences between the groups, there is no evidence available which may be used to support this position. In view of Bensberg's (4) results showing no differences in the acquisition of reading and arithmetic between brain-injured and non-brain-injured and Gallaher's (10) study where the personality ratings yielded the "most impressive area of difference," these results are not so surprising. It is unfortunate that the data available on cottage activities and vocational training have not yet been analyzed. This might shed some further light on the picture.

Such findings generally tend to suggest that the Kephart and Strauss observation might not hold,

and, to the extent that the groups in this study were equally involved in the institutional program, their statement that the endogenous group might be markedly affected by a program of planned stimulation so as to produce a difference associated with etiology is not supported by this study.

A secondary consideration, but an important one, has to do with the failure of the techniques used in this study to differentiate the groups in the diagnostic sense. Tests of intelligence have never been regarded as the best method of arriving at a differential diagnosis of brain-injury. The Bender Gestalt and H-T-P drawings have been used for this purpose. The H-T-P results tend to support Bieliauskas and Kirkham (5) in a general fashion. The Bender-Gestalt results are certainly not what would have been expected from the previous work. In these data neither the mean scores of the groups nor their relative order are in keeping with the results reported by Bensberg (3), Feldman (9), and Baroff (2). Differences in scoring procedures might well affect the absolute size of the scores, but these would not be expected to affect the relative positions of the groups. Accordingly, one must conclude that the previous work is not supported, although the disparity in results may be attributable to differences in the populations studied.

The Vineland Social Maturity Scale measures likewise failed to produce statistically significant differences between the retarded groups. The organic group means generally tended to be lower than those of the familial group, but not to a significant degree. The point should be made that a more detailed examination of these data might show the presence of a significant trend in the distributions of the groups, but this analysis is not available. The frequently made comment about the failure of "omnibus" tests to reveal diagnostic differences seems relevant at this point, although the results with the Primary Mental Abilities Test do not suggest that any major trends within the retarded groups were missed in the area of intelligence.

At the time of the first examination, essentially no differences were found between the retarded groups. In spite of the matching of the four groups on Binet mental age, the normal group was significantly higher in PMA mental age. There was overlap on two sub-scores, perceptual and verbal, where the normal and unexplained groups did not differ. The normal group was also significantly better than the familial group in Porteus test age. The possible implications of such differences have already been dealt with by Cassel and Danenhower (8) to the extent that differences between groups on some other variable may be found correlated with PMA sub-scores in retarded groups considered matched for Binet M.A. While this does not appear to be the case in these data, the issue raised has to do with the criteria for matching a retarded group with a normal group. If this kind of study is contemplated in the future, it might be better to accept the theoretical position explicit in the PMA and investigate the relative adequacy of the groups in dealing with other tasks when they are matched for PMA profiles. In general, however, Gallagher's comment, "It would please the writer to believe that this study would represent the last of these attempts to obtain psychological and educational characteristics based on vague and oversimplified neurological classifications" (10, p. 69) would seem to be applicable.

Summary

This paper constitutes a partial presentation of the results of a developmental study comprising three groups of mentally retarded boys and a group of normal boys, matched for mental and examined four times over a period of three years with a battery of psychological techniques. More detailed analyses, item analysis, studies of variability, have not been carried out and some of the variables which might be revealing have had to be omitted from this presentation. Of the considarable number of scores available, results are presented for intellectual and achievement measures together with the Bender-Gestalt and the H-T-P drawings. The group means were examined for any indication that there were differences arising which might be related to the presumed etiology (familial, unexplained, organic) of the mentally retarded groups. Analysis of variance applied to those variables which appeared most promising did not support the hypothesis of differential development in these measures.

* This study was conducted at The Training School at Vineland. It was supported in part by Grant M-563 from the National Institutes of Health, USPHs.

Table 3.

Means and Standard Deviation for the Normal and Three Retarded Groups Scores on Standard Tests Used in the Developmental Project[1]

SCORE	NORMAL I	NORMAL II	NORMAL III	NORMAL IV	FAMILIAL I	FAMILIAL II	FAMILIAL III	FAMILIAL IV	UNEXPLAINED I	UNEXPLAINED II	UNEXPLAINED III	UNEXPLAINED IV	ORGANIC I	ORGANIC II	ORGANIC III	ORGANIC IV
Binet M.A.																
Mean	7.83	8.45	9.30	10.95	6.54	7.19	6.78	7.28	7.32	7.46	7.65	7.45	7.03	7.38	7.72	7.46
S. D.	1.25	1.35	1.67	1.83	2.58	1.20	2.65	1.39	1.29	1.28	1.32	1.39	1.65	1.97	1.86	1.68
Vineland Social Maturity Scale																
Social Age																
Mean	7.48	8.78	9.03	10.16	9.29	8.92	8.91	7.94	8.99	8.19	8.51	7.48	8.45	8.42	8.84	7.49
S. D.	.96	1.27	1.04	1.71	2.41	1.66	1.32	.92	1.52	1.42	1.43	1.45	2.15	1.52	1.55	2.15
Porteus Test Age																
Mean	8.83	10.57	11.50	11.52	7.17	9.86	9.31	10.64	7.98	9.65	10.43	10.80	7.68	8.93	7.90	10.31
S. D.	2.38	2.24	2.53	2.96	2.09	2.62	3.70	2.53	3.43	4.04	4.12	4.32	4.46	4.09	7.04	4.70
Primary Mental Abilities																
Mental Age																
Mean	7.79	8.19	8.29		6.78	7.16	7.56	7.04	6.95	7.19	7.52	7.17	6.71	7.10	7.42	7.03
S. D.	.81	.75	.60		1.28	1.04	.92	.85	1.05	1.08	1.17	.99	1.37	1.26	1.03	1.74
Spatial																
Mean	18.48	18.96	25.38		14.95	16.66	22.28	16.47	14.30	14.70	20.10	15.05	14.85	16.75	22.65	16.75
S. D.	2.69	4.39	4.30		5.14	4.21	4.11	4.15	5.93	6.62	7.64	7.08	5.97	5.52	6.31	5.92
Perceptual																
Mean	23.39	25.78	27.29		19.95	22.50	24.51	24.89	20.10	20.50	22.35	23.95	17.45	20.70	23.15	22.65
S. D.	5.10	3.89	1.30		6.90	4.65	4.04	2.76	7.89	7.18	7.86	6.81	9.80	8.28	5.66	6.64
Verbal																
Mean	41.26	44.43	44.71		36.57	40.33	42.38	42.71	39.20	40.50	41.90	43.40	37.40	40.15	40.55	41.60
S. D.	5.19	3.23	4.59		7.47	6.18	3.96	4.43	4.49	4.09	5.49	4.49	6.24	5.44	5.71	4.90
Motor																
Mean	35.43	45.57	28.71		42.15	45.00	20.18	20.75	33.35	40.75	17.65	19.80	34.60	40.25	19.65	20.65
S. D.	11.99	11.52	13.53		13.58	11.30	11.04	7.82	12.07	12.19	6.61	11.03	13.26	15.41	10.85	10.85
Quantitative																
Mean	21.35	22.13	22.86		16.04	16.37	17.80	18.61	17.20	17.50	18.75	20.25	15.15	15.85	16.85	19.00
S. D.	3.88	3.39	3.31		6.94	6.14	5.83	6.17	6.74	6.69	6.91	5.90	7.98	7.76	7.08	6.23
California Achievement																
Total Reading																
Mean	37.80	44.41	53.42	78.13	24.85	27.47	33.80	34.03	32.40	32.85	35.25	37.95	26.55	30.15	34.75	33.45
S. D.	22.79	22.28	20.16	19.90	19.88	19.16	17.93	20.36	20.51	21.39	19.74	20.90	21.99	17.19	18.88	20.21
Arithmetic Fund.																
Mean	7.05	10.57	18.10	23.71	7.71	10.47	11.95	11.38	9.55	11.95	13.95	12.75	9.70	12.20	14.30	14.15
S. D.	9.25	8.87	10.27	7.06	8.13	8.91	9.23	8.77	10.30	10.94	12.20	12.20	11.89	13.03	11.95	12.59

Vocabulary																
Mean	30.15	34.93	39.37	53.85	21.71	24.51	29.89	28.32	26.90	27.25	30.05	31.30	20.90	26.80	28.55	28.15
S. D.	13.94	11.73	10.40	16.39	14.33	27.83	31.78	31.08	13.53	13.51	11.96	12.31	15.58	13.01	10.70	12.63
Total Arithmetic																
Mean	15.40	20.32	34.32	46.11	13.33	14.42	19.37	26.28	15.85	18.15	22.00	29.25	16.55	17.85	22.20	30.15
S. D.	19.72	18.82	20.67	10.59	13.83	14.01	15.06	14.65	17.49	19.08	20.25	20.79	18.86	19.69	19.68	21.17
Total Score																
Mean	57.94	70.04	102.27	148.55	42.89	45.13	57.88	65.40	54.00	56.45	64.25	68.55	47.65	52.95	61.40	68.75
S. D.	51.15	48.39	49.19	44.43	37.63	37.48	38.17	34.71	43.73	48.09	47.22	47.91	44.49	42.33	42.52	45.18
H-T-P Person																
Page area																
Mean	33.23	23.71	22.23	26.42	40.27	52.03	57.55	44.74	44.15	50.15	42.13	48.35	46.55	55.75	51.30	45.03
S. D.	27.29	18.73	16.34	22.66	20.39	33.36	36.76	33.68	24.05	31.77	17.94	32.87	28.01	35.40	35.56	30.71
Goodenough elements																
Mean	14.57	16.14	15.88	17.84	16.61	14.95	16.66	16.52	13.85	15.85	13.47	13.60	17.35	17.55	16.40	16.41
S. D.	5.38	4.92	6.36	6.48	6.43	5.18	24.22	8.85	4.86	6.73	5.74	5.82	9.55	10.71	9.09	8.48
Time																
Mean	68.25	79.82	79.43	76.41	79.83	105.77	95.10	111.15	85.74	134.10	114.35	146.55	118.56	140.28	143.07	157.06
S. D.	40.43	63.86	61.14	45.19	46.23	105.20	56.84	98.15	52.92	95.74	99.27	160.22	93.14	192.13	194.80	141.82
H-T-P House																
Page area																
Mean	65.73	49.33	54.85	64.88	55.41	63.69	75.07	75.54	66.05	59.80	91.60	89.05	99.40	88.90	79.55	77.58
S. D.	38.66	32.92	25.92	45.16	30.64	39.42	42.92	35.34	37.86	39.47	51.30	57.60	42.31	47.76	41.52	55.18
Time																
Mean	61.21	75.08	90.96	73.14	71.35	134.09	93.40	73.40	71.68	133.25	88.00	123.85	158.59	148.05	127.82	119.03
S. D.	34.33	43.03	71.26	49.84	36.97	177.23	68.05	41.76	32.38	130.26	57.87	121.37	144.26	148.84	103.19	98.44
H-T-P Tree																
Page area																
Mean	42.28	41.50	41.93	62.56	54.79	49.41	64.49	59.31	43.85	54.85	67.50	67.95	65.38	63.55	65.35	59.33
S. D.	27.14	21.22	26.63	33.37	29.96	33.89	29.98	42.87	27.43	41.24	40.36	47.41	28.48	39.99	44.09	41.30
Time																
Mean	27.14	60.06	64.29	47.67	46.01	48.12	50.30	54.75	43.70	58.50	69.59	73.75	63.27	80.50	65.86	66.12
S. D.	18.56	65.22	22.39	38.15	29.82	47.93	46.66	43.08	36.94	81.23	105.27	94.61	43.39	113.58	73.68	63.56
Bender-Gestalt Figures																
Raw Score																
Mean	91.87	67.90	66.12	65.82	112.19	107.29	89.44	91.11	105.05	87.55	87.40	89.00	96.65	95.50	82.00	78.00
S. D.	39.66	29.08	20.82	14.78	34.82	40.16	29.17	22.34	41.37	38.16	27.65	28.59	42.96	46.99	30.78	36.30
Design VI																
Mean	11.44	7.92	7.22	5.09	11.90	11.04	8.99	7.33	10.95	11.60	11.15	10.55	12.35	10.65	9.95	8.63
S. D.	6.01	4.47	3.61	3.32	6.43	5.12	6.83	4.61	6.50	6.73	4.84	5.30	7.44	5.24	4.97	4.18

1. The entries in this table represent a selection of the total 45 scores. Included are those scores we considered most important, plus the nine scores on which analysis of variance was used.

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HOME-SCHOOL CO-OPERATION

ETHEL M. AVERY, B.S.

(Ed. Note: During 1955 and 1956 The Training School at Vineland operated Workshops for Parent Consultants. Persons attending were selected by their local chapter of the National Association for Retarded Children. The purpose was to have each person attend the workshop for a full week to be better qualified to act as the lay consultant for the local group of parents. Mrs. Avery attended the first such workshop in 1955 and was thereafter designated by her local unit as its Parent Consultant. As a layman she has been very active in her own unit as well as speaking to other groups. Because many professionals must work directly with parents and other laymen on these problems, it is important for them to understand the laymans' ideas and attitudes through such material as Mrs. Avery's article. H.A.D.)

In more and more communities, the local board of education is providing for the needs of mentally retarded children. It seems fitting that the parents of the children and the personnel in charge of special classes become cognizant of their responsibilities in the area of home-school co-operation. Perhaps a glance at the problems of parents in relation to school administrators may provide useful insights.

It is generally assumed that it is the teacher who has goals for the children and that it is her duty to enlist the parents' interest in the pursuit of these goals. As a matter of fact, it is the observation of the writer that the parents of retarded children do have goals for their children; and that, in most cases, the goals are the same as those set by the school for the child; both the parents and the school want the child to develop a sense of personal worth, a measure of self-control and co-operation, respect for authority, and a sense of achievement. Perhaps it is difficult for the parents to define the goals this precisely or for the administrator to infer that they are in possession of this information; but one thing seems certain: the parents do recognize the fact that the public school provides help and that they must enlist this help in order to promote the child's maximal growth.

Yet strained parent-teacher relations often exist. The root of the trouble could lie in a lack of parental understanding regarding the attainments of the special education program. Consideration must be gven to the fact that parents as well as their children are often sensitive to any program that appears to omit the tool subjects. Parents respect these elements and consider them an essential part. The traditional concept of education as conceived by most parents is based on the subject-type curriculum. Accordingly, parents want their children to have training in reading, writing, and arithmetic. The teacher of the special class may be helpful to the parents in describing the curriculum designed with experience units. Such a curriculum places emphasis on developing habits, attitudes, and skills; it inculcates hygienic practices; it provides much time in the school day for games, rhythms, enjoyment of music and stories; rather than stress the 3 R's, it teaches reading, English, and the number skills to the extent that the children are capable of handling them in their adjustment to the demands of society.

To establish this understanding and acceptance by the parents and to further a wholesome relationship between the school and home, both sides must work together.

The Parents' Viewpoint

Generally speaking, parents of the more severely retarded children have been aware of the child's condition from the time the physician, pediatrician, or neurologist confirmed their suspicions, and attached the label or diagnosis. As the child approaches kindergarten age, it seems reasonable that the school administrator should assume some responsibility for counseling the parents. They are aware that their child needs the opportunity to mingle with peers and to profit by the play environment afforded in the classroom with a qualified teacher. When the normal 5 year old is taken to school by the mother at the time of summer roundup, why is the retarded child ignored? There is concern shown by the school authorities for the normal child's welfare. Let the superintendent alert the Parent Teachers Association to the fact that retarded children may be rounded up, too. At the present time, with summer roundup committee comprised of neighbors, there is still much apathy shown retarded children . . . almost as though they suffered from the effects of a communicable disease!

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One might argue that the mentally retarded child of trainable level, at the age of 5 years, is hardly ready to function adequately in the kindergarten program intended for the normal. Never the less, the principal could serve as a counselor; the school psychologist might administer tests; and the nurse could visit and evaluate the home. The findings of the team could be transferred to the parents fruitfully. The names of pre-school facilities which offer assistance in toileting and feeding problems would be helpful for both the parents and the child. In the meantime, the school is aware of the need of preparing room in special class at a future date for the child.

It may be that the child will never fit into a trainable class. If the school administration shows concern and understanding of the problem the parents will more likely accept its judgment. There are parents who feel that, because they are taxpayers, they are entitled to the benefits of public school for their children in any event. Mild-natured mothers sometimes become fighting-mad at the school psychologist who classifies their children as non-trainable. Much trouble may be stirred up by the mothers who are not dealt with tactfully and offered an alternate plan of action. When the parents are turned away by the school they develop a feeling of inadequacy; it is as if the community regards them as unworthy because of having a retarded child.

There are the children whose retardation isn't too evident until they enter a regular class program. In most instances, the parents are aware that the child's development is different from the normal. They probably have sought their physician's advice and have been told that the child was slow and would grow out of it. This could be the marginal, borderline, or educable child. For many years the philosophy of progressive education that permits promotion without success has allowed the school to offer regular class for the slow child. In the elementary school where there is grouping according to abilities this placement may be meaningful. The child at the intermediary level suffers: he experiences failure repeatedly; he may have emotional difficulties that have repercussions at home as well as in the classroom, and that stifles social development; he develops little or no reading skill; and most important, he is not prepared for a job. Regular placement affords this child two alternatives; to become either a recluse or a bully. At sixteen, the child has little incentive to stay in school and quits unequipped to live in a highly competitive society.

Bernie's case illustrates this point. He attended regular class in parochial school from 1-6 grades, although the school and parents suspected that the boy needed special educational treatment. A class for educable children was opened in the intermediary level of the local public school. Bernie's mother approved transfer from parochial school. Since the special class was managed by a trained teacher, it was a good first year for the boy. Bernie was recognized by the teacher as being socially immature, relating poorly to his peers. His difficulties with his classmates inevitably resulted in a show of violence. The teacher would shield him from the other's wrath. Unfortunately, she died and her replacement was inexperienced. This teacher didn't have time or skill to bother to protect Bernie. In no time, the boy's aggressiveness led to repeated expulsion. Consultations were held between parents, teacher, and psychologist. Medication was prescribed by his physician. Several times, the boy was permitted to return to class and within hours, he was seriously upset.

Finally, the mother made arrangements for psychological and psychiatric testing to find out the cause; results of the tests determined definitely that the boy was of borderline mentality with no evidence of dementia present. Actually, after school, Bernie was conducting a successful shoeshining business. He's managed to save $1,000.00. He was equipped with an arithmetic skill that astounded both his testers . . . yet without due regard to his home life, the school psychologist's solution for this problem was that the boy needed the protective custody of an institution. The final disposition of the case was to be permanent expulsion. Fortunately the parents were alerted to this proposed action and were present at the school board meeting when the superintendent read the report. A plea that cited factors previously omitted was made to the school commissioners and further consideration of the matter resulted in their offering home teaching as a substitute. This was not the ideal solution but it did afford the boy the benefit of individual attention within an intensified program. The school commissioners considered the total picture; the child survived as an individual entitled to a second chance under different conditions.

If Bernie had started special class in first grade, he might have made successful adjustment at intermediary level because he had acquired social skills that would be useful in his peer and teacher relationship. Experience demonstrates that chil-

dren who have been swept along with the tide from K-6 grades with their peer-aged group and placed in special class from 7-12 grades may easily become academic and social outcasts.

The school may err in placing a child when retardation is suspected in kindergarten. Test results may raise a question as to whether the child should be placed in trainable or educable class in lieu of 1st grade. To avoid frustration that may result from over-rating, the child is placed in trainable class. Beneficial as this setting may be for the child, it may have unhappy consequences for the mother. Teachers are mostly concerned with the welfare of the child; the mother may be overlooked. This happened in the case of Linda, who seemed like any 7 year old girl yet functioned mentally at the borderline between educable and trainable levels. Linda had no physical anomalies; her speech was good, and her social development and peer relationship adequate, whereas the children who comprise her trainable class had marked physical defects, speech handicaps, and ranged in age from 6-20 years. Linda's mother found it difficult to see her child a member of this heterogenous group.

At first, Linda was happy in her class, but with time, she sensed her mother's hostility and prejudice. Because of disapproval of the trainable class, the child was kept home frequently. The mother, believing that the children spent their time in free play during the school day, rationalized her action, but Linda's opportunity for growth was diminished. It is clear that the mother wanted the best for Linda. Neighbors, friends, relatives falsely advised the mother about Linda's needs. Somehow communication between the teacher and the mother was disrupted; the teacher failed to convey the advantages of special class and the mother was unable to accept Linda's mental defect.

Linda is now 10 years old. The outcome is still undecided; with the child becoming increasingly aware of the stigma her mother attaches to her class, prognosis for recovery is not good, nor is there hope for eventual transfer to educable class.

A final case shows how bungling may occur if a severely retarded child is placed in regular kindergarten. Mary was diagnosed at birth as being mongoloid. The parents accepted this information and joined the local Association for Retarded Children, supporting its activities zealously. When Mary was 5 years old, she was tested by the local school psychologist and the pre-school program was recommended for the next year, but with the promise of public school the following year. Mary progressed in the pre-school environment. Since the trainable class was full the next year, she was entered in regular kindergarten. She seemed happy: she played well with other children; she did not disrupt the class routine; in fact, her speech improved. The tragedy of kindergarten occurred not to Mary but to her parents: they began to question the validity of the diagnosis and to think of Mary as normal. At the end of the first year of kindergarten, the psychologist found the parents completely unable to accept their child's transfer out of regular class to the trainable class. Since this time, Mary's parents have withdrawn from the Association for Retarded Children; they do not co-operate with the school; they are on the defensive with everyone. In an attempt to perform a service when it was not available, it is apparent that the school committed an error in evaluating the parents' acceptance of their child's true mental state.

The Teacher's Viewpoint

The teacher, ever striving for better home-school co-operation, will find the child her closest and surest ally; undoubtedly, he carries home his attitudes toward the classroom, thereby transferring his feelings to his parents. Therefore, it would be advisable to work at creating amenable attitudes in the child. This may be done by allowing time daily for exchanges of experiences between child and teacher, informing the child of present achievements with a view to future expectancy and letting the child participate in record keeping. Through this process of maintaining the child's interest in on-going-activities and cultivating his awareness of his own progress and growth, the teacher's goals will be realized.

Another measure of success in the teacher-child relationship is the child's enthusiasm to attend school; the parents will not easily disregard this behavior. When rapport exists between the teacher and the child, the parents are very much aware of it. Despite the fact that the school presents situations that may hold varying degrees of challenge or frustration, if the child expresses an eagerness to attend, the teacher may be sure she has won his trust, love, and confidence; she may safely consider that the child regards her as his mainstay. The situation is well covered by the guiding principle of The Training School: HAPPINESS FIRST . . . ALL ELSE FOLLOWS!

It will be impossible to get the complete picture of the child without gaining parental confidence.

It is utterly necessary for the teacher to understand the influences working on the child in the home: the economic level of the family, the mental status of the parents, the emotional climate, interest in the child's welfare, and moral values. The degree of success that the teacher has with the child will depend on her taking these factors into account as she works towards the child's physical, social, emotional, and vocational fulfillment.

To secure this information, home visits and conferences are needed. The success of the teacher with the parents will depend on her approach; a spirit of friendliness, helpfulness and sympathy must prevail. A local Association for Retarded Children, recently, initiated a study group for parents of pre-school, mentally retarded children. The discussion leader was a mother of two normal youngsters, working part-time with a Visiting Nurses Association; she was well versed in normal child development. The parents attending these sessions agreed that they were most helpful. The question arises whether there could be parent-teacher study groups. They could meet on a weekly basis with the teacher acting as leader. It would be possible through this medium for the teacher to interpret her role to the home; develop wholesome family attitudes towards the child; secure the co-operation of the parents in developing habits and attitudes in the child; discover home inadequacies; share more complete histories; cultivate family interest with a view to supporting the teaching process; in short, fashion a unified plan of action for the child.

The place of the psychologist, nurse, principal, and school board might be clarified by their participation in the series. Perhaps for a first time the parents will understand the purpose of the expert in the field of mental retardation. Many parents lament about the Parent Teacher Association meetings that gear programs for the normal child. Parent-teacher study sessions could be a means by which the teacher might lick the problem of gaining parental approval and co-operation.

In conclusion, since the school must provide and take responsibility for the nurturing of the special class child for several years of his life, an optimal relationship between the home and school is a must; it will result in good mental health for both parties. The focus of attention will never swerve from the child; teacher and parents will be rewarded and thrilled with the child's progress if there is acceptance, understanding, and compassion exhibited by both.

Summary

Parents need to be understood, and to understand how their children can be helped professionally. The school personnel should encourage the parents to come forward with their problems at school round-up time; they should be heard with sympathetic understanding and counseled with tact regarding pre-school facilities.

Children with marginal intelligence require skillful handling, for misclassification can ruin their chance for eventual adjustment. Special class placement is best effected early if it is to be considered at all.

Decisions as to whether a child should be treated as trainable or educable are more difficult. The parents' feeling as to this classification must be considered. Counseling may enable parents to be accepting. It is also important to avoid overrating children; in such cases, parents are headed for eventual disappointment.

From the teacher's point of view, the family can benefit by having the children participate in recording progress. Rapport is bound to assure everyone that all is well. Home visits and parent-teacher discussions can be fruitful, assuring optimal co-operation.

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